Museum to Showcase Navy Military Medical Innovations

Principal Investigator of the U.S. Naval Research Laboratory (NRL) Navy Coronavirus Rapid Response Team (NCR2T) Team, Brett M. Huhman, Ph.D., P.E. from the Advanced Pulsed Systems Section and former NRL Engineering Technician Mike Jabari prepare a Xenon source for evaluation testing. Designed for whole-room disinfection, the team determined how effective the source would be from a light perspective, and Naval Surface Warfare Center Dahlgren Division followed up with a site visit to perform biological efficacy testing in the Ultraviolet Characterization Lab at NRL-DC Headquarters, May 2020. (U.S. Navy photo)

By Nicholas E. M. Pasquini, U.S. Naval Research Laboratory Corporate Communications, April 22, 2025

WASHINGTON, D.C. — The U.S. Naval Research Laboratory (NRL)

recently transferred a number of historical artifacts related to the COVID-19 pandemic to the National Museum of Health and Medicine and is scheduled to exhibit military medical innovations to the public, Apr. 26.

The Military Medical Innovation Family Event program takes place in the museum galleries where presenters from a variety of military activities conduct demonstrations and activities highlighting innovative products and research that benefit readiness, health, care, and rehabilitation of the warfighter.

In April 2020, during the early stages of the COVID pandemic, the Naval COVID Rapid Response Team (NCR2T) was established by Naval Sea Systems Command (NAVSEA) after the USS *Theodore Roosevelt* (CVN 71) became the first ship in the U.S. Fleet to fight through a COVID-19 outbreak. The chief of naval operations then charged NAVSEA with evaluating technologies and developing processes and procedures to provide tools for Fleet commanders, type commanders, and ship commanders to ensure and promote mission readiness amidst the pandemic.

NRL was tasked by NAVSEA with evaluating the efficacy of ultraviolet light sources procured by the NCR2T. The Plasma Physics Division leveraged experience across multiple disciplines to design a standardized measurement test stand, verify calibration of measurement equipment, and perform analysis of the devices.

NRL researchers evaluated commercial ultraviolet (UV) sources for viral disinfection to combat COVID-19 on land and at sea and established a dedicated UV characterization lab in five days to ensure safe introduction and effective operation of UV sources across the Fleet.

This work was done in close collaboration with the Naval Surface Warfare Center Dahlgren Division, which performed

biological surrogate testing to evaluate the effectiveness of the UV sources for disinfection of COVID-19 on surfaces relevant to Navy applications. The devices range from small, hand-held UV sources to large devices meant to disinfect an entire room.

The laboratory used an automated 3-axis motorized translation stage to measure the light emitted from ultraviolet light sources to measure both the intensity and quality of the light generated by the devices. Data was collected from this apparatus to create 2D "maps" of the light emitted from the sources to enable comparison of different technologies.

In addition, NRL's work helped identify situations where use of UV provides sufficient viral disinfection at a particular energy level and the development of standard operating procedures to ensure safe UV operation for the Fleet.

"NRL's commitment to performing leading-edge fundamental and applied research has enabled the Lab to be instrumental in numerous innovations that have significantly enhanced the capabilities of the U.S. Navy and nation as a whole," said NRL Plasma Physics Division Superintendent Joe Peñano, Ph.D. "This legacy of innovation underscores NRL's commitment to swiftly supporting Fleet operations as well as addressing emerging challenges."

The devices transferred were critical in the development of the Navy's response to the COVID -19 pandemic. "These devices represent hundreds of hours of research by engineers and physicists in the Plasma Physics Division at NRL to provide evaluation criteria to the Fleet for immediate use," said Principal Investigator of the NRL NCR2T Team, Brett M. Huhman, Ph.D., P.E. from the Plasma Physics Division. "We were able to respond rapidly to NAVSEA's call for support, with a laboratory set up and ready to evaluate the devices within a week."

Military medical innovations are changing the way health care is delivered in the Military Health System. During this family-friendly event, visit with DOD experts as they showcase the latest in virtual reality, medical simulation, and much more. This is a great opportunity to speak with multi-disciplinary NRL subject matter experts to also learn more about other research programs and associated technologies on display:

Buzz Off: Protection From the Small, But Deadly
This station demonstrates recently developed NRL technology that defends from some of the most dangerous animals on the planet—bugs. In this demo, we will go over the historical impact of insects on military and civilians, current strategies to protect against these tiny assailants, and future polymer-based fiber and gel technologies to repel these bugs out of everyday life.

From Sample to Sequence in the Field: A Closer Look at Bacteria and their DNA
Bacteria live in nearly every environment on earth and are important to this planet's ecosystems. Most serve a useful purpose, but some can cause disease in humans. Using strep throat as a case study, we will demonstrate some of the tools and latest technologies we use to identify and study bacteria, including uncovering the genetic sequence of these tiny organisms with a portable DNA sequencer.

About the U.S. Naval Research Laboratory
NRL is a scientific and engineering command dedicated to research that drives innovative advances for the U.S. Navy and Marine Corps from the seafloor to space and in the information domain. NRL is located in Washington, D.C. with major field sites in Stennis Space Center, Mississippi; Key West, Florida; Monterey, California, and employs approximately 3,000 civilian scientists, engineers and support personnel